

Multi-decadal trend of freshening over the Southern Ocean coastal regions based on a progressed parameterization technique

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The Southern Ocean coastal regions (SOc) is suffering continuous freshwater input from the Antarctic glacier due to the ongoing global warming, resulting in a prominent seawater freshening. This will have widespread impacts on the global ocean. Recent studies about the freshening in the SOc based on satellite monitoring and ship-based observations, are spatiotemporally limited by the severe weather conditions of the Southern Ocean. This may bring large uncertainties to our understanding for the response of the Antarctic to the climate change. To estimate more accurate freshwater input over the entire SOc, we proposed a new method based on the parameterization technique using only basic hydrographic parameters. Applying this method to the SOc during the recent 100 years, we found twice larger rate of freshening compared to prior studies. The rate of freshwater input had reached a maximum by 397 ± 30 Gt year⁻¹ over 1986 – 2006, which was probably attributed to the recent intense basal ice shelf melting along the west Antarctica, implying a mean sea level rise of 1.1 ± 0.1 mm year⁻¹ for the global ocean.

References

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